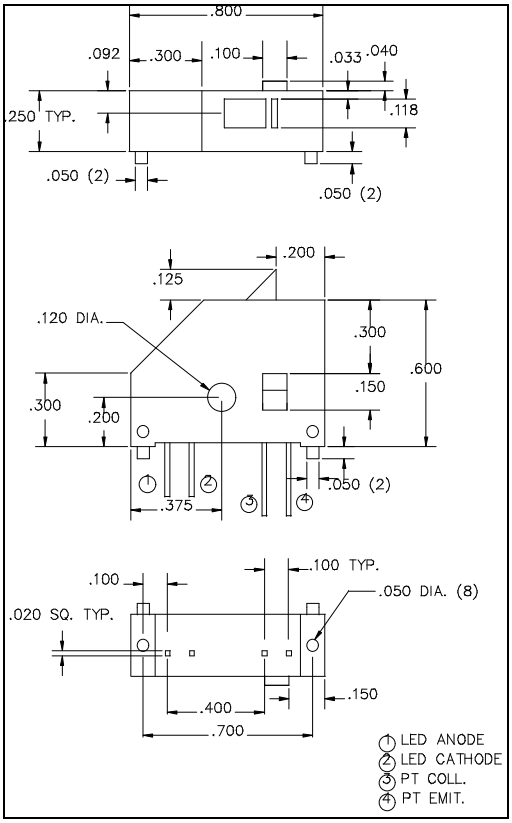
Single Emitter Bar Code Optic Head OTR480/490/482

FEATURES:

- **Single Emitter Bar Code / Fine Line Sensor**
- **Better than 0.010" Resolution**
- **Compact Size**
- **Easily Ganged for Multiple Channels**

PRODUCT DESCRIPTION

The OTR480/490/482 series combine a single emitter with a phototransistor in a compact low cost package containing a lens and aperture. The OTR480 has a 940 nm infrared emitter and a phototransistor. The OTR490 has a 660 nm visible red emitter and a phototransistor. The OTR482 has a 940 nm infrared emitter and a phototransistor with an ambient light filter, for use in high ambient light conditions. These devices are easily ganged for multi-channel applications. Consult factory for custom apertures, emitters, or sensors.



Absolute Maximum Ratings

General

Storage Temperature Range ---------- - 55°C to +100°C
Operating Temperature Range ---------- - 40°C to +85°C
Lead Soldering Temperature (1/16" from case
for 5 seconds soldering iron, 10 seconds flow soldering)---------- 260°C

Infrared Emitter (940 nm)

Reverse Voltage ---------- 5 V
Continuous Forward Current ---------- 120 mA
Peak Forward Current ---------- 1.5 A
Power Dissipation ---------- 100 mW

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Visible Emitter (660 nm)

Reverse Voltage ---------- 4 V
Continuous Forward Current ---------- 40 mA
Peak Forward Current ---------- 300 mA
Power Dissipation ---------- 100 mW

Phototransistor

Collector-Emitter Voltage ---------- 30 V
Emitter-Collector Voltage ---------- 5 V
Power Dissipation (Derate 2.4 mW/°C above 25°C) ---------- 100 mW

Product Specifications (T_A = 25°C unless noted)

Infrared Emitter

Parameter	Symbol	Min	Typ	Max	Units
Forward Voltage (I_F = 50 mA)	V_F		1.3	1.45	V
Reverse Current (V_R = 5 V)	I_R			100	µA
Peak Wavelength (I_F = 20 mA)	λ_P		940		nm
Radiant Intensity (I_F = 20 mA)	I	1.3	2.5		mW/sr
Spectral Bandwidth at 50% (I_F = 20 mA)	$\Delta\lambda$		50		nm
Half Intensity Beam Angle	θ		10		Degrees

Visible Emitter

Parameter	Symbol	Min	Typ	Max	Units
Forward Voltage (I_F = 20 mA)	V_F		1.8	2.4	V
Reverse Current (V_R = 4 V)	I_R			100	µA
Peak Wavelength (I_F = 20 mA)	λ_P		660		nm
Luminous Intensity (I_F = 20 mA)	I_V	250	500		mcd
Spectral Bandwidth at 50% (I_F = 20 mA)	$\Delta\lambda$		20		nm
Half Intensity Beam Angle	θ		10		Degrees

Phototransistor

Parameter	Symbol	Min	Typ	Max	Units
Light Current (Ee=0.1mW/cm^2, V_{CE}=5V)	$I_{CE(ON)}$	1	2.8		mA
Dark Current (Ee=0, V_{CE}=10V)	I_{CE0}			100	nA
Saturation Voltage (I_C=0.5mA, Ee=0.1mW/cm^2)	$V_{CE(SAT)}$			0.4	V
Rise Time (V_{CC}=5V, R_L=1kΩ, I_C=1mA)	T_r		15		µs
Fall Time (V_{CC}=5V, R_L=1kΩ, I_C=1mA)	T_f		15		µs

Coupled Characteristics

Parameter	Symbol	Min	Typ	Max	Units
Light Current (I_F = 20 mA, V_{CE} = 5V, d = 0.125 in)[1]	$I_{CE(ON)}$	5	10		µA
Dark Current (I_F = 0 mA, V_{CE} = 5V)	I_{CE0}			200	nA
6 dB Bandwidth		3			kHz

[1] Reflecting surface is Eastman Kodak neutral white test card having a 90% diffused reflectance.

Reflective Surface

Parameter	Symbol	Min	Typ	Max	Units
Element Contrast		(80%)			%
Diffused Reflectance		(90%)			%
Element Width	W_N	0.010			in
Narrow Element to Narrow Space Ratio			0.95		
Depth of Field	d	0.090	0.125	0.160	in

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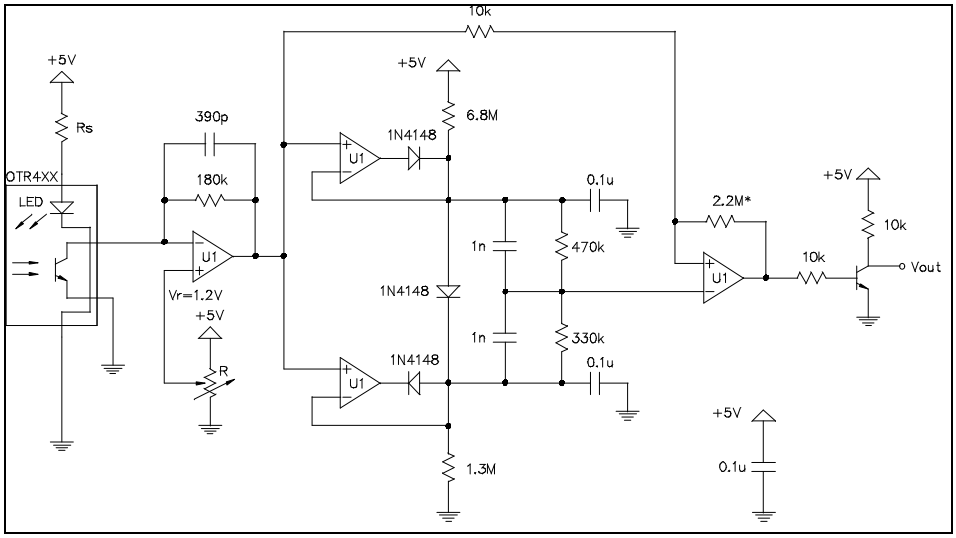
Suggested Application Circuit



The above circuit represents an adaptive dual peak detector with a first stage transimpedance amplifier. This circuit is recommended for typical bar code or fine element sensing applications using the OTR480/490 series optic heads. The first amplifier servers as a current-to-voltage amplifier (transimpedance). The second part of the circuit provides positive and negative peak detection. The peak voltages are temporarily stored in the 0.1 µF capacitors. The comparator reference is approximately 45% of the peak-to-peak amplitude. This, in effect, provides an adaptive threshold to the comparator based on the voltage peaks of the incoming signal. The 2.2 MΩ resistor on the last stage (indicated with an *) sets the positive feedback, and combined with the 10 kΩ input resistor the hysterisis is set to approximately 25 mV. Setting the 2.2 MΩ resistor to 100 kΩ will increase the hysterisis to 500 mV, but response will be sacrificed. Vout is low for reflectance and high (+5V) for no reflectance (i.e., sensing a dark mark).

Ordering Information

OTR4 X X - N N - 0

Emitter:
(8) 940 nm Infrared
(9) 660 nm Visible Red

Sensor:
(0) Phototransistor
(2) Phototransistor w/ ambient filter

Note: Option 2 available with infrared emitter only.

Aperture Size:
(0) 0.006" x 0.090"
(C) Custom

Number of Channels:
(01) 1 channel
(02) 2 channels
(NN) NN channels

Note: Test capability to better than 0.003" channel-to-channel alignment available.

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